

Claims

- [c1] 1. A method for decomposing the polyester component of a commingled post-consumer or post-industrial waste into monomeric and oligomeric units constituting a portion of an ester solvent composition comprising: (a) admixing commingled waste with an initial ester solvent composition containing at least one cyclic ester; (b) heating the admixture to a temperature above about 215 degrees Celsius for a period of at least 3 minutes to form a second ester solvent composition; (c) cooling the second ester solvent composition to a temperature below about 70 degrees Celsius; and (d) separating the second ester solvent composition from solid impurities by sedimentation, flocculation, filtration, centrifugation, or combinations thereof.
- [c2] 2. The method of claim 1 wherein in step (a) the initial ester solvent composition comprises about 98% to about 30% by weight of the admixture.
- [c3] 3. The method of claim 1 wherein in step (a) the polyester materials physically separated from post-consumer or post-industrial waste are poly(ethylene terephthalate).
- [c4] 4. The method of claim 1 wherein in step (b) the admixture

is heated to a temperature above about 230 degrees Celsius.

[c5] 5. The method of claim 1 wherein in step (b) the admixture is held at a temperature above about 215 degrees Celsius for a period of at least 15 minutes.

[c6] 6. The method of claim 1 wherein in step (a) the initial ester solvent composition is constituted principally of ethylene carbonate, propylene carbonate, butylene carbonate, or combinations thereof.

[c7] 7. The method of claim 1 wherein in step (a) the initial ester solvent composition is constituted principally of propylene carbonate.

[c8] 8. A method for decomposing poly(ethylene terephthalate) face fibers from post-consumer carpet into components of a liquid ester solvent composition comprising: (a) admixing the poly(ethylene terephthalate) face fibers with an initial ester solvent composition containing principally ethylene carbonate, propylene carbonate, butylene carbonate, or mixtures thereof; (b) heating the admixture to a temperature above about 220 degrees Celsius for a period of at least about 5 minutes to form a second ester solvent composition; (c) separating the second ester solvent composition from solid polyester and impurities by

electrophoresis, sedimentation, flocculation, filtration, centrifugation, or combinations thereof; (d) cooling the second ester solvent composition to a temperature below about 30 degrees Celsius; and (e) separating the cooled second ester solvent composition from precipitated solids by electrophoresis, sedimentation, flocculation, filtration, centrifugation, or combinations thereof.

[c9] 9. The method of claim 8 wherein in step (a) the solvent is propylene carbonate, ethylene carbonate, or mixtures thereof.

[c10] 10. The method of claim 8 wherein in step (b) the admixture is heated to a temperature above about 230 degrees Celsius.

[c11] 11. The method of claim 8 wherein in step (a) the poly (ethylene terephthalate) face fibers constitute between 2% and 50% by weight of the admixture.

[c12] 12. A method for decomposing polyester into compounds having an appreciable solubility in cyclic esters at about 30 degrees Celsius and constituting a component of a liquid ester solvent composition comprising: (a) admixing polyester with ethylene carbonate, propylene carbonate, butylene carbonate, or mixtures thereof; (b) heating the admixture to a temperature above about 220 degrees

Celsius for a period of at least about 5 minutes to form an ester solvent composition; (c) separating the ester solvent composition from solid polyester and impurities by sedimentation, flocculation, filtration, centrifugation, or combinations thereof; (d) cooling the ester solvent composition to a temperature below about 50 degrees Celsius; and (e) separating the cooled ester solvent composition from precipitated solids by sedimentation, flocculation, filtration, centrifugation, or combinations thereof.

[c13] 13. The method of claim 12 wherein in step (a) polyester is admixed with propylene carbonate.

[c14] 14. The method of claim 12 wherein in step (b) the admixture is held at a temperature above about 220 degrees Celsius for a period of more than about 15 minutes.

[c15] 15. The method of claim 12 wherein in step (d) the ester solvent composition is cooled to ambient temperature.

[c16] 16. The method of claim 12 wherein in step (b) the admixture is heated to a temperature above about 230 degrees Celsius.

[c17] 17. Chemical compositions employed as solvents

containing at least (1) decomposition products of poly(ethylene terephthalate) polyester and (2) one or more cyclic esters.

- [c18] 18. Chemical compositions employed as solvents containing as one component compounds resulting from the thermal degradation of poly(ethylene terephthalate) dissolved in ethylene carbonate, propylene carbonate, butylene carbonate, or mixtures thereof.